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AUTHOR Serle, Oenone
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ABSTRACT

The Australian engineering company, Jaques, and Swinburne University of Technology conducted a joint project to write more than 190 operating instructions for the company's 77 employees. First, the university's Workplace Skills Unit (WSU) interviewed 75 production workers to identify their language, literacy, and training needs. The WSU negotiated a written agreement with Jaques to write the operating instructions as a fee-for-service activity. All production employees participated in the process of writing the work instructions at workshops facilitated by WSU consultants. Before the first workshop, the WSU conducted research on the relevant international manufacturing standards and national quality procedures and finalize the approach to and procedure for drafting the instructions. A program implementation strategy was developed that included the following components: briefing production employees, forming writing groups, and conducting workshops that were based on a team approach and structured to accommodate group dynamics and respond to changes in plant operations occurring during the project. The workshops focused on developing team skills, creating model operating instructions for workers to follow, and facilitating the writing process while drawing on employees' expertise. The project was credited with significantly changing attitudes toward safety and teamwork at the company. (MN)

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Writing for safety

ED 410 405

Facilitating a team approach to writing operating instructions

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ANTA Leading Edge Training Case Study

JAQUES

Swinburne
University of Technology

CE 079 551

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Writing for safety

Facilitating a team approach to writing operating instructions

Written by Oenone Serle

ANTA Leading Edge Training Case Study 1996

A training partnership between **JAQUES** and the Workplace Skills Unit,

Swinburne
University of Technology

Writing for Safety
Facilitating a team approach
to writing operating instructions
ANTA Leading Edge Training Case Study
An Australian National Training Authority
Research Advisory Council (ANTARAC)
funded project.

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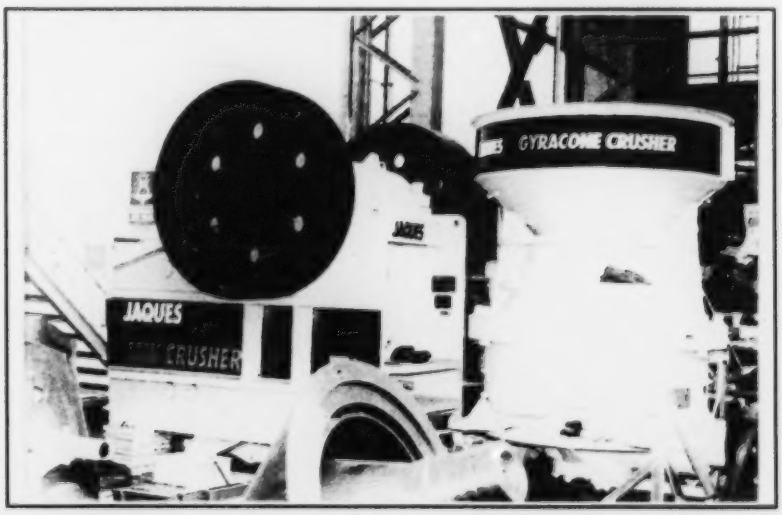
Introduction

The Australian Metals and Engineering Industry is being exposed to a rapidly increasing level of foreign competition. This has led to a need for increased productivity and the achievement of international quality accreditation.

Jaques, an engineering company located in Richmond, Melbourne, has implemented a range of initiatives in response to this challenge of an increasingly competitive market. One of these initiatives, involving a partnership between the Workplace Skills Unit (WSU) Swinburne University of Technology and Jaques, is the focus of this Case Study.

Jaques was, until recently, a division of Clyde Industries. The company has for over a hundred years had a factory located at the Richmond site. They design and manufacture metal rock crushing and quarrying equipment used in the mining industry. This equipment includes vibrating grizzly feeders, single toggle jaw crushers and gyratory crushers. As distinct from many metal and engineering companies, Jaques is not a production line but a jobbing shop. Production staff work from engineering designs developed according to customer specifications.

This case study will look at a writing project that the Workplace Skills Unit of Swinburne University of Technology undertook with the entire production workforce at Jaques. The project involved the writing of over 190 operating instructions by the seventy-seven employees. The project resulted in significant cultural change in the factory, changing attitudes to safety and teamwork.



Completed crushers: 35 gyracone (right) and (left) single toggle jaw crusher

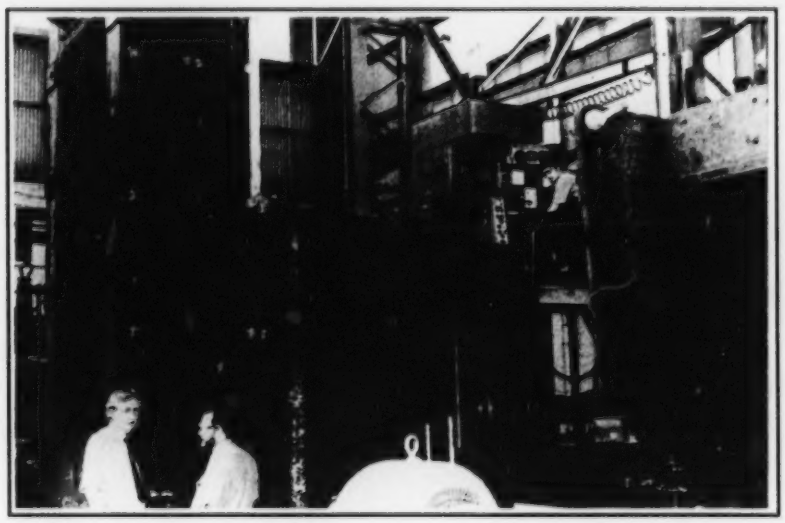
Background

In 1994, the Manager of the Workplace Skills Unit initiated training at Jaques that was funded by the Commonwealth Adult Literacy Program (CALP). Peter Matters was at the time Operations Manager at Jaques. He was aware of the need for language and literacy skills development for the production workers, particularly in relation to their future work towards ISO 9002. The on-site language and literacy training that was provided between May and August 1994 was to lead to the writing project that is the focus of this case study.

As part of the language and literacy training program, seventy-five individual interviews with production workers were conducted by Mariette Byrne and Roe Maas of the Workplace Skills Unit. Through this process a better understanding was gained of the language, literacy and numeracy training needs of the workers.

Based on the interviews, the following profile of the Jaques workforce was developed. Workers included :

- English speaking background (ESB) and non-English speaking background (NESB)
- a range of ages (17 – 65)
- men only

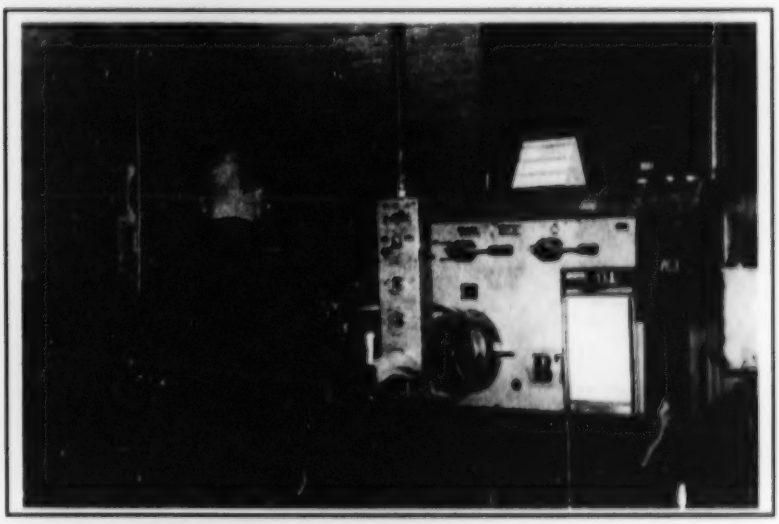


Horizontal borer machining a crusher frame

- tradesmen and unskilled labourers
- casual employees, permanent employees and contractors
- nightshift and dayshift
- those with a negative perception of training
- those with varying levels of concern about safety
- recently employed apprentices and those who had worked at Jaques for over twenty years.

The Workplace Skills Unit project coordinator, Oenone Serle, commented that in retrospect these initial interviews were to prove helpful in providing an introduction to all individuals in the workforce who were later to participate in the operating instructions project. Through working on-site to deliver the language and literacy course, the WSU trainers were able to gain insight into the particular work environment and some knowledge of the products manufactured at Jaques.

The confidence of Jaques' management in the ability of the WSU consultants to develop customised training programs was established through the language and literacy training.



Operating instruction on the horizontal borer

The impact of the 1994 Enterprise Bargaining Agreement

At the time of the language and literacy training Jaques was negotiating an enterprise bargaining agreement which was coordinated through a consultative committee. The Enterprise Bargaining Agreement of 1994 included four Key Performance Indicators (KPI):

- safety
- quality
- efficiency
- service

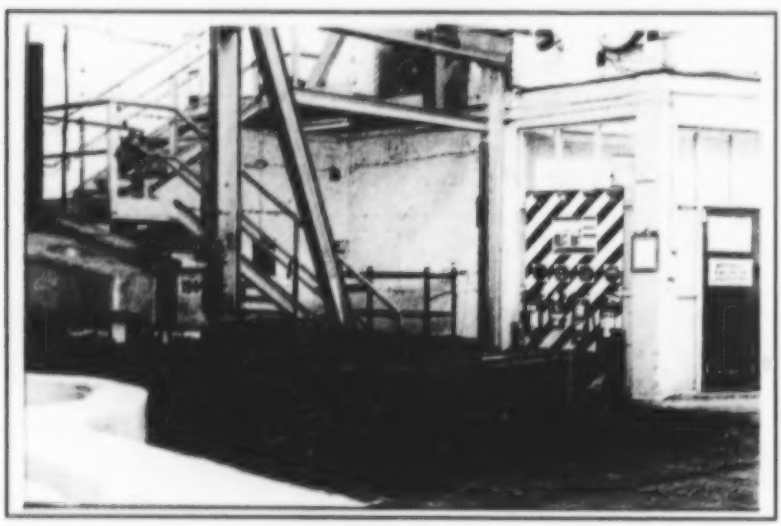
A safety KPI sub-committee had been formed, comprised of the Operations Manager, Peter Matters, and three factory workers, David Pandevski, Mathew Joy and Robert Bruch. Its task was to decide how the safety key performance indicator would be measured. They did not want to simply look at statistics on accident frequency or severity. The Consultative Committee Chairman suggested that they write procedures on safety, in groups, to be audited. Management was pleased with the idea as it was seen as a way of regularly monitoring conformance to safety procedures.

The writing of the operating instructions was subsequently used as part of the process for negotiating a payrise through achieving the safety KPI in the 1994 Enterprise Bargaining Agreement. A 2% pay rise was agreed to if the safety record improved and on completion of the operating instructions. In fact, this was subsequently granted before all the operating instructions had been completed.

The WSU became involved in the concept of writing procedures on safety when the Operations Manager requested that the funding originally targeted at plain English strategies for supervisors be redirected to a more pressing need for training in relation to safety and the ISO 9002 certification.

There was a need to design and write work instructions for the factory. Furthermore, all production employees were expected to be familiar with and to fully understand the content of these instructions.

Jaques' management realised that the WSU language and literacy expertise would be critical to ensure that the language used in the instructions was appropriate for the employees.



Planer with operating instruction

Aims of the writing project

In undertaking this project, the writing of operating instructions for the entire factory, the company's aims were to:

1. achieve acceptance of a team approach to work on the shop floor
2. foster problem solving through team effort
3. improve the shop floor approach to conflict resolution
4. improve employees' attitudes to safety
5. educate employees in safe working procedures
6. create operating instructions which would provide a means of measuring compliance to agreed procedures
7. transfer skills to inexperienced employees
8. create opportunities for the development of leadership skills
9. improve the written and spoken communication skills of employees.

Submerged arc welding with operating instruction

Program development

During the six months between the end of the literacy training course and the commencement of the work instructions workshops in February 1995 negotiations and preparation occurred for the implementation of the writing program.

It was necessary for Jaques to delay the start of the workshops due to the following:

- production demands were high
- other in-house training was being conducted
- a proposal for concurrent computer training was being considered for the factory
- the operations manager's job was being redefined
- a new production manager was employed
- Enterprise Bargaining was occurring
- and key Jaques personnel were on annual leave.

In November 1994 a written agreement was prepared between Jaques and the Workplace Skills Unit to undertake the writing of operating instructions with the workforce, as a fee for service activity. The clarification of the implementation plan for the agreed operating instructions project then took a number of months.

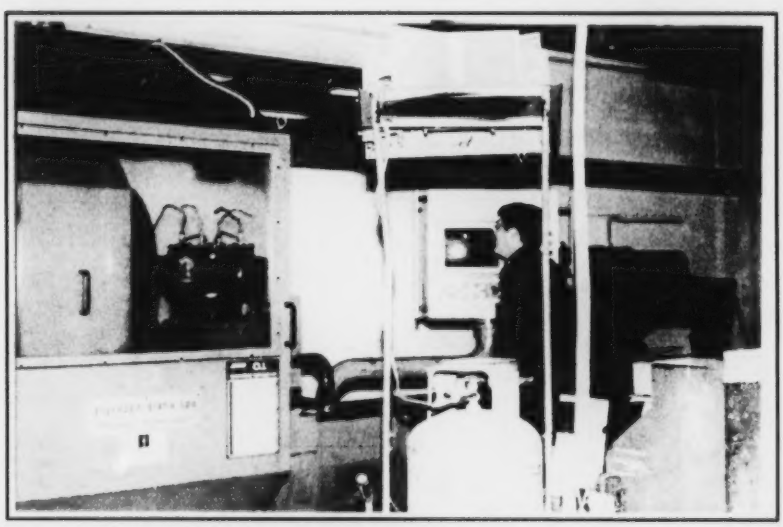
A crucial issue was to determine how the task would be achieved. To design the delivery of such a program the consultants needed to clarify the boundaries of the project. For example, how many work instructions were needed? How many people would be involved? Acquiring this information proved difficult to achieve, partly because company personnel could not necessarily provide the answers.

Approaches to time release

A process for the writing of the instructions needed to be devised by the WSU and Jaques. In order to design a delivery plan two proposals were considered.

The first saw the WSU consultants working with a group of supervisors and team leaders selected by Jaques. This group would be trained in the skills necessary for facilitating groups. They would also be shown the model format for the operating instructions and write some of the instructions. They would then work with the rest of the workforce as group facilitators. The value of this proposal was the limited time release involved.

The other proposal foresaw all factory workers attending workshops facilitated by the Workplace Skills Unit consultants. All production employees would be involved in writing the work instructions.



NC lathe operator with operating instruction

The company chose this second alternative because the benefits were anticipated to be:

- the fostering of ownership of the work instructions by all employees
- an increased awareness and understanding of safety issues
- the multiskilling of employees through their familiarisation with operating procedures and safety issues in all areas of the factory
- the integration of language and literacy skills development
- improved communication between employees across the different areas in the factory
- that all employees would receive quality training through the partnership with the WSU, Swinburne
- that it would be communicated that employees' expertise and company experience was highly valued by Jaques' management
- the development of team skills and problem solving strategies
- the development of effective conflict resolution strategies
- a better understanding and therefore tolerance of cultural differences
- a greater awareness in young and/or new employees of the considerable skills of long-term employees
- the piloting of an action learning approach to training that Jaques could then adopt and implement independently.

Research and preparation

In the months prior to the delivery of the first workshop the WSU team conducted a range of research activities which included:

- researching the requirements for certification with ISO 9001
- identifying appropriate examples of work instructions, or standard operating procedures from the engineering/ manufacturing industry
- considering the language, structure and format appropriate for a model work instruction for Jaques
- reading the Jaques quality manual
- attending training on quality procedures preparation, run by Quality Services Australia
- liaising with the Jaques quality engineer to ascertain the status and nature of work being done in preparation for ISO in other departments. The aim was to foresee and prevent any clash with other elements of the quality system
- developing the model for the Jaques operating instructions
- clarifying how the exercise would be presented to the workforce
- defining the roles of company and Swinburne personnel involved in the project
- establishing the procedure for the word processing and redrafting of the instructions
- endeavouring to resolve questions relating to time release, groupings and scheduling.

Program implementation

Given the outlined goals of the project and the training needs of the employees, the following processes were used in the implementation of the program.

Briefing production employees

The WSU consultants anticipated that Jaques employees would be more receptive to the proposed program if they were given the opportunity to understand the rationale for the program and pose questions in an open forum. Briefing sessions were scheduled for all areas of the factory, both day and night shift, to provide for this open discussion.

It was important to clarify how the planned program would be presented to the workforce and how they would be motivated to commit themselves to the program. The briefing sessions were planned carefully and discussed on a number of occasions. The WSU consultants scripted the planned presentations once agreement about the content had been reached.

It was agreed that the briefing sessions were to be held to:

- explain why work instructions had to be written
- inform employees that they would all be participating in writing workshops and the reasons for this
- explain the links between the workshops and the enterprise bargaining agreement and pay rise
- present a tentative schedule for the workshops and explain that sessions would be in paid work time
- give employees the opportunity to ask questions about the program in an open forum.

Briefing sessions were subsequently held for the seventy seven production employees. They were conducted by the three WSU consultants, representatives from senior management, production employees on the Enterprise Bargaining consultative committee and safety KPI sub-committee, and the union representative.

The briefings not only served their purpose as information sharing sessions but they also provided an opportunity for employees in representative roles to practice their skills in presenting information to a group. One safety KPI sub-committee member was to later comment that he now felt more confident in his ability to address the whole factory.

Forming writing groups

Seven writing groups were formed based on specific work areas in the factory:

- boiler shop/fabrication
- machine shop lathes
- machine shop mills
- machine shop vertical borers
- fitting shop
- transport and spare parts
- night shift.

Later in the project an additional group was formed to represent the service department. The writing groups were to range in size from seven to seventeen employees.

Scheduling of workshops

In order to enable all production employees to participate in the workshops sessions were scheduled to cover all shifts. Each group attended a fortnightly one and a half hour writing workshop.

Day shift attended during their normal hours, whilst night shift were expected to come at 5.00 p.m. before normal starting time at 6.30 p.m. Jaques' management wished to work like this even though it was pointed out that there was some discrepancy. It was difficult to accommodate the needs of night shift employees in scheduling the workshops. A number of alternatives were tried and eventually the night shift group began its session at 6.30 p.m. at the start of the twelve hour shift.

The workshops started on 3 February 1995. Each fortnightly lot of seven workshops for the entire staff was referred to as one 'round'. This pattern continued for all groups for at least eighteen rounds (or thirty six weeks). The project took fifty weeks. However the number of participants diminished.

There was a staggered finish due to the size of the task of writing instructions for each area. By August 1995, some groups had nearly finished their task. The transport group and boilershop had only four more sessions. Night shift writing workshops finished at round twenty, at the end of 1995.

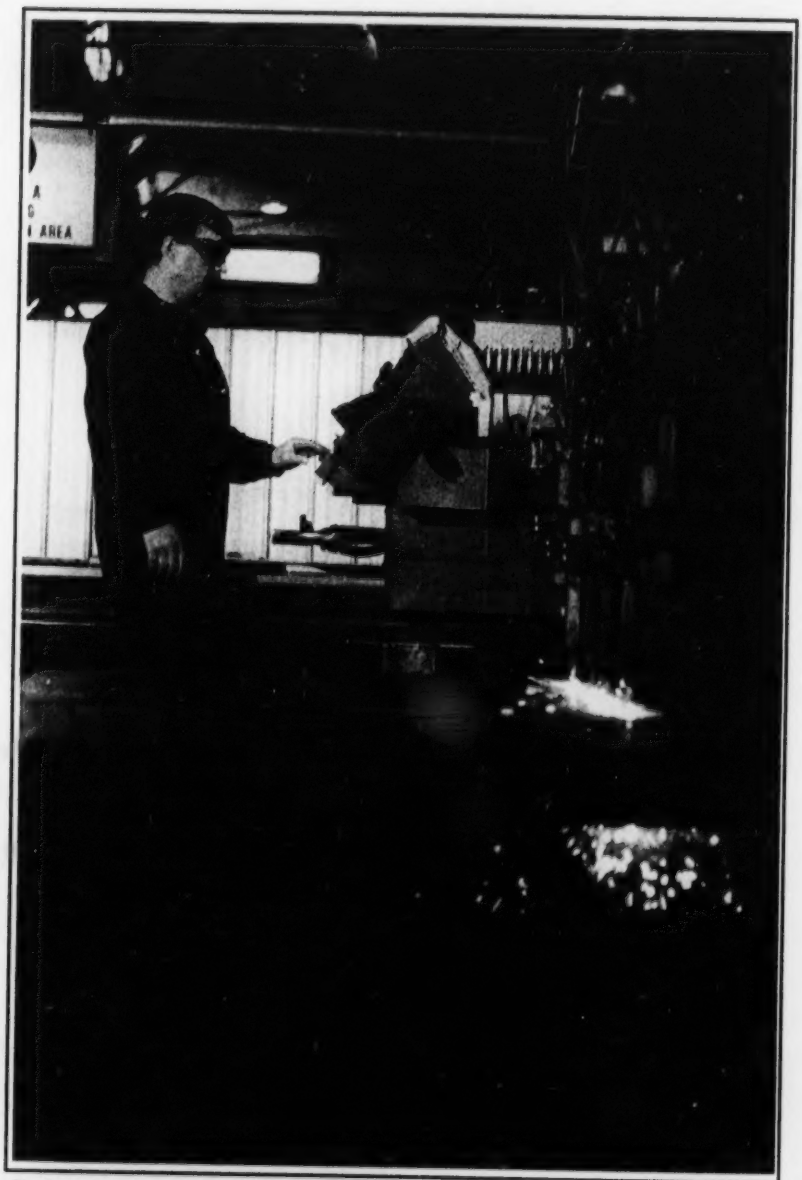
Using a team teaching approach

In the initial weeks of the program a team teaching approach was used with two WSU trainers working with each of the work area groups. This strategy was adopted for at least eight rounds and then discontinued.

Team teaching provided a number of advantages, which were to make the training more effective in the first rounds. Some of the writing groups were large. The size of these groups meant that at times the process was accelerated through greater access to ideas and expertise while at other times the writing process was slowed because of lengthy debate. One of the trainers was to explain later that the use of team teaching kept everyone participating. "I think that the team teaching made the groups hang in there more. If a contentious issue came up, one of us could follow that group and let them talk it out, while the other one could continue working with the rest of the group."

She suggested that team teaching gave an added quality to the feedback that was required to coordinate the job. The trainers could discuss their opinions on the effectiveness of the training, the mood of the participants and alternative strategies if needed. This was useful as groups initially followed similar session plans for each round. The trainers could use the reaction of earlier groups to refine later sessions.

After nine sessions most groups were run by one trainer. The changing needs of groups and other work commitments of the trainers meant only some workshops continued to be run in tandem.



Boiler shop worker at the profile cutter

Accommodating group dynamics

The diversity in the makeup of the Jaques' workforce contributed significantly to the group dynamics during the writing workshops.

Differences in age impacted on these dynamics early in the program. Conflict would sometimes arise between the young and old because of the perceived differences in expertise. However, these perceptions were to change later as the workshops gave individuals an opportunity to share their experience and knowledge of the processes being discussed. One of the WSU consultants noted this change of attitude. "There were the young cocky blokes, largely intolerant of the guys who'd been there forty years with enormous expertise, but who tended to go on and on... by the time I'd left those initial differences had been resolved. (The men) had become more tolerant." Likewise by the end of the program the younger apprentices had become more involved due to the encouragement offered by the more experienced employees.

Like the age differences, the differences in language and literacy skills were also to impact on the group dynamics. All employees were expected to participate in the writing sessions, however some of the most experienced and skilled tradesmen spoke little English. In endeavouring to utilise the expertise of these people, the trainers asked participants to act as interpreters while the other participants waited for comments to be translated into English. This was a new approach to training for some, which required great patience and was at times time-consuming.

The perception as to why the operating instructions were being written was periodically an issue to some of the employees. They felt the need for further clarification as to the purpose of the instructions if they were to continue to contribute during the writing workshops. They had difficulty accepting that there could be multiple reasons for the documenting of all Jaques' procedures. Some employees feared that their considerable skills and experience were being tapped into for the publication of instructions that would mean any person could be employed off the street and come in and take their jobs. Clarifying these issues formed a regular part of the workshops, although it was not always appropriate for the WSU trainers to speak on behalf of Jaques' management.

Responding to changes

A number of changes occurred in the implementation of the program. In September 1995 the workshops for the service department began. Rather than following a set schedule, the WSU trainers booked sessions with the service department participants according to their work demands. Service department employees must provide on-site service to customers when the need arises.

After seven months the program arrangements for the fitting shop changed. The group had the skills to work more independently, so they began writing in four hour blocks, with a Swinburne trainer present for only one hour of each block.

The previously separate lathe, vertical borer and mill groups were merged to form one machine shop group working on the remaining operating instructions. The machine shop writing group began meeting weekly at round 19 in November 1995 and finished in May 1996.

Late in July 1995 the nightshift group began reviewing the material written by other groups, rather than writing new operating instructions. Employees on this shift were experienced operators from all areas of the factory. Sometimes there was only one employee with the relevant knowledge for each area, who checked the drafts that the day shift group had written.

In October 1995 the initial contact person for the project left Jaques and the project was handed over to the new production manager. The WSU consultants were subsequently required to liaise with the person coordinating the quality standards' paperwork.

The deadline for certification with international standards was constantly postponed. Jaques required more time to prepare. In discussions in mid 1995 Jaques was aiming for the end of that year. By September 1995 the deadline was said to be March 1996, then July 1996.

Program content

Developing team skills

Training was a new experience for many of the men. Some had never attended training sessions delivered in the English language while others had done trade training some years ago. Certainly, the writing of operating instructions was to be a challenging task for the majority.

Management was keen that there be agreement and ownership of the operating instructions. Full participation by all was considered to be an important goal. The initial training sessions were therefore used to introduce the group members to the skills required to work effectively in teams.

Topics covered in these initial sessions included:

- team member roles, such as note-taker, discussion leader, time-keeper
- problem solving strategies e.g. brainstorming
- decision making processes.

It was decided that for unresolved issues during the workshops the WSU consultants would not act as arbitrators. Technical experts or management would, if necessary, be consulted. It was however agreed that the groups needed to voice disagreement, but eventually reach consensus, if the documented operating instructions were to be adhered to.

Creating a model

The first workshops were also used to introduce a model of the operating instructions to the workforce. The model provided the format for writing all of the Jaques operating instructions.

In order to create this model, the WSU team researched existing formats of documented operating instructions. Given that the operating instructions were supposed to be written and read by the factory floor workers, with varying language skills, the aim was to identify essential elements and headings while being brief and clear.

SAFE WORK INSTRUCTION

Name:

Purpose:

Scope:

Health and Safety:

-
-

Records:

Location:

Notes and definitions

Document no: **Date** **Revision no:** **Page** **of**

It was difficult to find examples of operating instructions because most companies consider these to be confidential documents. Certifying bodies such as Quality Assurance Services provide guidelines and examples, however, most examples outlined production line procedures which were not applicable to the Jaques' jobbing shop.

Jaques' personnel were consulted when devising a customised format. Operating instructions were being written for other departments and the consultants foresaw the need to keep the factory's operating instructions as consistent as possible. The language used needed to be straightforward and comprehensible.

Facilitating the writing process

Initially, the plan was to use a team approach to the writing of the operating instructions. Small groups were to work on different instructions at the same session. It was planned that each group would decide what to write about using the list of topics that had been prepared by the safety sub-committee. The group was then to discuss the selected topic and write a draft, with a note-taker documenting the operating instruction. The draft was then to be written up on a whiteboard for the other small groups to comment on. It was thought that this method might produce a number of work instructions quickly, while also allowing for practice in team skills and improvement in communication skills.

The plan was however abandoned after a few sessions. When the small groups debated, the note-taker did not know which version to write down, so he would often resort to writing his own version. Due to the range of language and literacy skills of participants and the push by Jaques to complete the writing of the operating instructions, the roles of the participants in this process was reviewed.

The consultants were to assume the role of scribes and to give more direction to discussions, thereby enabling participants to contribute constructively. The group members sometimes lacked the skills to keep the discussion focussed and to reach a conclusion that was acceptable to all. A significant number of participants were reticent to contribute during the writing process because they perceived that their writing skills were inadequate for the job.

The priority was to complete the work within a set timeline. The improvement of employees' language and literacy skills was to be a secondary goal.

Program content

STARTING LIST OF POTENTIAL OPERATING INSTRUCTIONS

Workplace Procedures
- General conduct - Horseplay
- Radios
- Housekeeping
- Communications with machine operators (e.g. NC lathes)
- Borrowing equipment
- How to handle machine defects
- Storage and handling of fuel gases

Fitting Shop
- Welding procedures
- Oxy cutting
- Carbon arc gouging
- Use and care of tools/equipment
- Painting
- Assembly of machines
- Testing machines
- Storage of equipment
- Accumulation of components

Machine Shop Lathes
- Start up and operating instruction for each lathe
- Removing guarding swarf
- Use of air hose
- Storage of materials and finished jobs
- Storage of tools
- Setting up jobs in machine
- Identification of jobs
- Removal of flashes and burrs

Machine Shop Milling Machines and Borers (V & H)
- Procedures as for lathes with detailed instructions for particular jobs.

Stores and Transport
- Receiving material
- Forklift operation
- Pallet truck operation
- Loading trucks
- Stacking of parts
- Lifting equipment

Boiler shop
- Welding procedures
- Oxy cutting
- Carbon arc gouging
- Plate and material handling
- Plate rolling
- Guillotine
- Brake press
- Storage of lifting gear and tools
- Fabrication

Night shift
- Specific work instructions for all machines

Measuring Equipment
- Use and storage
- Reporting defects
- Repair and adjustment

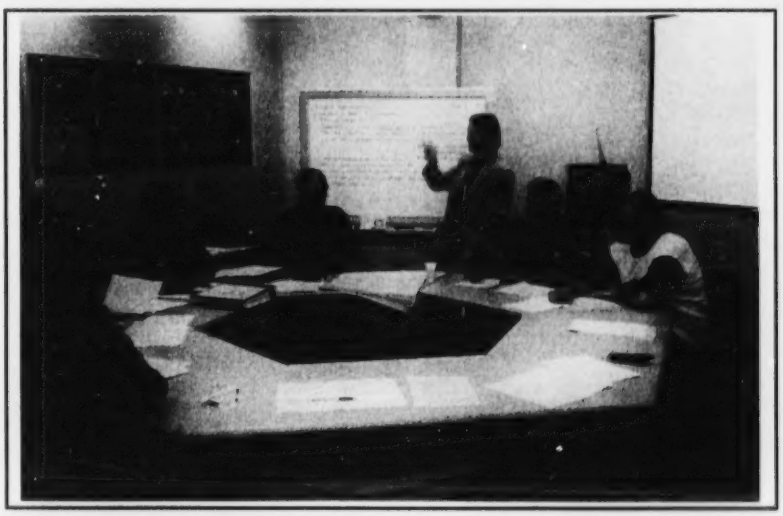
Reflecting on this change of strategy, a participant from the boilershop commented, 'Originally it was going to be more the blokes doing it themselves. We didn't seem to be getting anywhere real quick. Then you took over. That was the best thing you ever did. It would take me three times as long to write'. He also acknowledged that the WSU trainers had the skills to keep the group on track, write down the different versions and provide impartial umpiring of disputes.

This change in plans is one example of the dynamic working relationship that was developed between Swinburne and Jaques. The operations manager described this relationship in his evaluation of the project: 'The program was only broadly defined by the company with training format, delivery method and changes discussed and implemented to achieve the required outcome.'

Drawing on employee expertise

The groups concentrated on the instructions that were directly relevant to their areas. For example, the boilershop wrote about welding; the machine shop wrote the start up and shut down of the vertical borer; the transport group wrote about crane operation.

The time taken by a group to write an operating instruction varied significantly due to the number of steps, which ranged from three steps to more than thirty five steps, and the technical difficulty of the process that was being described. Sometimes briefer operating instructions involved lengthy debate due to the need to agree on safe practices and watertight wording.



A writing group in the training room

Program content

JAQUES O.I.
OPERATING INSTRUCTION

JAQUES	OPERATING INSTRUCTION	OI–S009
		Page 1 of 1
Subject:	**Use of Wash tank**	

Purpose: To Safely Use Wash Tank to Clean Parts

Health and Safety:
- Wear safety shields and gloves while working with tank.
- Keep skin covered by protective clothing.
- Close lid after loading parts and while tank is operating.
- Keep lid closed when tank is not in use.
- In case of liquid splashing into eyes or skin, flush liberally with water immediately and get medical attention if eyes are affected.

Method:

NOTES:
- Liquid in tank is caustic (alkaline) and it is hot.
- Rope slings and wire should not be put in tank.

1 Lift lid and check level and temperature. Liquid level must be higher than heating coils and drip tray. Temperature should be set at 80°C. Use hose to add water to bring up level, and stay nearby to prevent overfilling.
2 Skim waste off surface, using skimming ladle.
3 Raise tray to top of tank.
4 Clean excessive grease off parts to be washed.
5 Load parts onto tray, distributing weight evenly. Be careful not to overload. Only ferrous metals should be washed in tank.
6 Flick switch to lower tray and stand clear to avoid being splashed.
7 Flick agitator switch from 'off' to 'agitate'.
8 Set agitator speed as required to control splashing.
9 Close lid and leave until clean.
10 To unload, open lid, flick agitator switch to 'off', flick tray switch to 'raise'.
11 Lift parts onto drain tray, using lifting equipment as required . [Ref: OI - G019]
12 Wash parts down with hose.
13 Store parts for re-assembly.

Rev.	Revision description:	Date	Approved by:
—	First issue	04.96	J.Miltos

Program coordination

There were variations in the workers' enthusiasm throughout the fifteen month writing process. It was necessary to encourage the employees and maintain momentum. Coordination was needed for the process of redrafting and the documenting of final versions.

Providing administrative support

Due to the large number of operating instructions being documented it was necessary to engage an administrative assistant. This assistant at Jaques took a key role in the program. She was responsible for the word processing of all of the 190 operating instructions through each draft stage. It was also her responsibility to keep the index of the completed operating instructions. She was to become a key liaison person for the group leaders, consultants and KPI sub-committee.

Editing of the work instructions was the responsibility of the Workplace Skills Unit consultants. They attended to the grammar, spelling and punctuation and checked for consistency in terminology.

Seeking consensus

Extensive consultation with all employees was lengthy and often complicated. Normally drafts went to the safety KPI sub-committee and were approved or returned with questions and comments for further work. Operating instructions that applied to everyone were examined by the entire workforce. The review and redrafting process was time consuming but essential to ensure the quality, accuracy and safety focus of the operating instructions.

Involvement in the task was apparent from the competitive attitude adopted by the machine shop and boiler shop, and also the night shift and fitting shop. They were most concerned as to whether their drafts had 'passed' or been approved by the sub-committee. This was indicative of the employees' general enthusiasm for and interest in the task.

After approximately six months of writing, a decision was taken that the WSU consultants could: accept the expertise of the author group, assume the operating instruction was acceptable, issue it to the factory floor and check it via audits and night shift. This was an acknowledgment of the fact that the employees were highly experienced and many had worked at Jaques for over ten years. It was also an indication of the developing aptitude of the groups in writing operating instructions.

Record keeping

There was extensive cataloguing of the operating instructions and recording of their current status (unfinished draft, finished draft, at sub-committee, in consultation with writing groups, redrafted or issued to the factory). It was necessary for the WSU consultants to complete weekly updates of the status of the written instructions. The WSU Project Coordinator took responsibility for coordinating the review and the record keeping process.

Attendance records were kept. Reports on attendance were an item of interest for the KPI sub-committee, who were committed to the continuing participation of the whole workforce.

Ongoing consultation

The Workplace Skills Unit and Jaques' partnership was maintained through ongoing consultation. The process included:

- regular meetings between the WSU training team and senior management
- a WSU representative attending fortnightly meetings of the Safety KPI sub-committee. This later also included employee representatives from the workshop groups
- liaison between the WSU project coordinator and the Jaques' staff and another consultant employed to advise on the implementation of a quality system and quality standards' certification.

Linking the program to the quality system

Late in 1995 Jaques was gearing up for quality certification. Operating instructions were written for other sections of the company's operation. The project coordinator worked with Jaques' personnel to change the naming and numbering of the work instructions so that they would fit neatly into the quality system. In addition, some sections in the instructions were modified (see original headings in model on page 23). For example, information in the 'scope' section that had been a useful tool for introducing and thinking through the first instructions was incorporated into the 'purpose' subheading. The 'location' subheading had been an interim measure to note the whereabouts of the document until a quality system with proper document control was instituted.

These changes were explained to the factory employees still involved in writing workshops, who easily adapted to the necessary minor changes in format. The quality system documentation provided a system of numbering that was predictable; the men could deduce the correct number when reading the manual of instructions on the shop floor. The workshops provided incidental training in the details of quality system documentation.

At the end of 1995 the existing 'safe work instructions', that had been issued to the factory, were all reformatted as 'operating instructions' to be incorporated into the company's quality system. This was done in preparation for the certification process, which was expected to take place in March 1996. The instructions that had been written by the employees from the factory were renamed, renumbered and edited by the staff member preparing the quality documentation for the whole site.

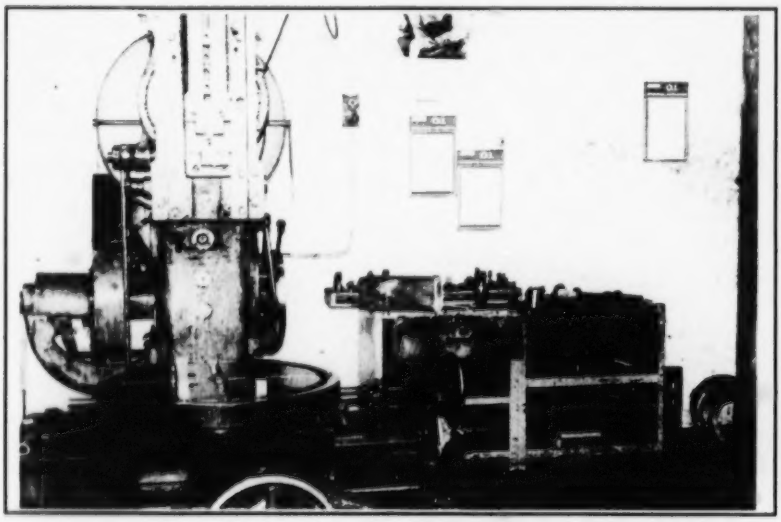
OPERATING INSTRUCTION CONTENTS

BOILER SHOP Page 1 of 1

Number	Rev.	Date	Subject
OI-B001	—	01.96	Brake Press - Operation of
OI-B002	—	01.96	Carbon Arc Gouging
OI-B003	—	01.96	Cold Saw (Caltenbach) - Use of
OI-B004	—	01.96	Guillotine - Operation of
OI-B005	—	01.96	Machine 405 - Profile Cutter Loading and Unloading
OI-B006	—	01.96	Oxy Cutting
OI-B007	—	01.96	Handling - Plate and Material
OI-B008	—	01.96	Punch and Shears - Operation of
OI-B009	—	01.96	Rollers - Operation of Large Rollers
OI-B010	—	01.96	Rollers - Operation of Small Manual Rollers
OI-B011	—	01.96	Rotary Welding Positioner - Setting up Job on
OI-B012	—	01.96	Saw - Use of Brobo
OI-B013	—	01.96	Welding Procedures
OI-B014	—	01.96	Furnace
OI-B015	—	01.96	Sub-Arc Welding
OI-B016	—	03.96	Sub-Arc Welding (P)
OI-B017	—	07.96	Stress Relieving Steel
OI-B M/C 155-01	—	01.96	Machine 155 Surface Grinder - Operation of

The operating instructions were then issued to the factory in controlled copies as the first official issue within a quality system. These new operating instructions were posted prominently on the relevant machines. Each different section of the factory had its own folder with the instructions relevant to their work. Generic operating instructions, such as those referring to the protective clothing policy, were included in a general section.

Internal audits were carried out every Friday. Procedures and documentation for non-conformances have also been put in place.



Slotter and work area with operating instruction

Outcomes

The Workplace Skills Unit's role as training providers and coordinators of the writing process finished in May 1996. At this point the following had been achieved:

- specific work practices and operations had been defined
- 193 operating instructions had been written, including 29 general instructions relevant to the whole production workforce
- the written procedures were structured so that they could be audited and revised if necessary
- there were written procedures for the safe operation of all machines in the factory (91 instructions)
- the service department writing group had documented an agreed set of instructions for servicing of Jaques' equipment (10 instructions)
- the Fitting Ship had completed the majority of the instructions for assembly of equipment (31 instructions)
- procedures for the safe movement of equipment and materials in the factory had been written (15 instructions)
- the Boiler shop had completed instructions for its area (17 instructions)
- weekly audits of particular operating instructions had occurred
- a model for the writing of operating instructions was established and would continue to be used by Jaques for writing further operating instructions. This model had been endorsed by the Consultative Committee at Jaques. The current factory manager was supervising on-going use of this customised model for the writing of Jaques' operating instructions.

Program evaluation

The operations manager, who was responsible for commissioning the project, was asked to evaluate the training. In his opinion there had been achievement in most of the aims of the project, as stated on page 10 of this report. Likewise, the participants' evaluation confirmed that these aims had been met.

Workshop participants were asked to evaluate the program. Their feedback was sought through a series of individual interviews and written questionnaires.

Overall the participant evaluations indicated that there had been individual improvement in a range of skills. Of the participants interviewed, over half noted personal development in:

- conflict resolution skills
- understanding of quality
- teamwork.

Most interviewees also claimed improvement in their

- awareness of safety
- problem solving skills
- communication skills.

The evaluation was also revealing in terms of the key aims of improved safety, quality and teamwork. The following sections summarise the feedback about these aims and other features of the project.

Safety

Between the financial years 1993-1994 and 1995-1996 the number of workers compensation claims lodged at Jaques dropped and the cost of claims fell. Late in 1995, the then manager of the quarrying and mining division partly attributed the improved accident rate to the work on the operating instructions when he addressed the factory employees, thanking them for their contribution.

This project was not to be evaluated according to Jaques' safety record. However, a sample of employees were asked why they thought the safety record had improved. They mentioned various causes including a bonus scheme, which involves workers receiving payments if there have been no accidents in their area for a certain period, the full implementation of the compulsory glasses policy and the education of employees in the workshops. However, safety was consistently mentioned when participants were asked to suggest the most positive aspects of the project. Statements included:

'Safe operation has become common practice.'

'The shop is cleaner.'

'The workplace has become safer.'

'As long as the work procedures are adhered to it will keep on being a safe working environment and the accident rate will keep coming down.'

'You know exactly what safety gear is to be used while using that particular machine.'

'Reduced accidents due to details on how to use the machine correctly and less incorrect operation.'

'The operating instructions recently have helped remind and enlighten people to work safely rather then do the job quickly, rush it, take short cuts.'

Quality

In the past there has been disagreements between employees about the correct way to do a job. These disagreements were partly a result of the lack of documented operating procedures. Participants in the program appreciated the fact that procedures were now documented and there were clear guidelines.

However, one participant did express his concern that the operating instructions were double edged, in that they can act as protection to employees if followed, but a tool for reprimand or dismissal by management when employees have not been conforming. Some thought the instructions had helped improve quality by raising employees' awareness about doing things the right way.

Problems sometimes encountered in companies that have instituted a quality system are: the production workforce do not understand it, are not aware of it, are not convinced about it, cannot comprehend the procedures manual or do not know where the manual is.

These problems often stem from the fact that the workforce has not been consulted. A supervisor commented that this is not the case at Jaques now. 'Initially people didn't really understand the purpose. They thought it was just to get the operating instructions written and put away in a book. Now we take them out, use them and upgrade them. They are posted around the place.' He added that, 'people are more aware of the need to work to procedures, to cooperate and ensure work is carried out safely. Thus efficiency is increasing.'

Teamwork

In evaluating the project many employees reflected on the structure of the program which enabled them to work and learn together in teams. 'Learning from other people's ideas in a group', was consistently cited as one of the positive aspects of the program.

Behavioural change

One of the aims of the project was to create a more positive attitude towards safety and foster a more cooperative approach to problem-solving on the shop floor. Anecdotal comments from both management and employees suggest that this was, in part, achieved.

Peter Matters, the initiator of the project, noted two significant changes in employees behaviour that he attributed to the training program. These were that:

- tradesmen were less inclined to ignore poor work practices by others
- there was acceptance of the need to set down and follow procedures to ensure a safe work environment with desired product quality.

A safety sub-committee member and a boiler shop worker backed up this evaluation by providing the following example of changed behaviour. 'When a job is set up and another man goes to check, if it wasn't clamped properly, he tells him and there's no argument. You've got to do it this way – it is written.'

The shop steward also commented on the change from workers' pottering along by themselves, to worrying about what others were doing and undertaking to do it together. The consultants noted that the workshops provided a neutral environment where work practices could be discussed and evaluated constructively. Work groups are, as a result, now better able to monitor their own performance.

Writing skills

The participants' confidence in their writing skills increased during the project. There were occasions when individual workers undertook to write and word process the operating instruction for a machine or process for which they had the expertise.

By the end of the project employees who had not seen themselves as writers were taking responsibility for documenting the operating instructions on behalf of the group. Some groups were eventually operating largely independently of the trainer.

The WSU as facilitators

A key question in evaluating the project was whether or not the company needed an outside consultant to implement the program. The feedback was unanimous. Jaques' management and employees alike recognised the need for someone to set up the program, provide a format for the operating instructions and facilitate the workshops.

The following participants' comments highlight this:

'You need certain skills, even to control the blokes.'
Supervisor

'It was good there was someone external; if it had been someone from Jaques the workshops might have been gripe sessions. Also we've got a lot of different nationalities, people who are not real good at English, can't write – a lot of people wouldn't show patience to let them give input.'

'You've got to have some training, some guidance throughout to keep us on the right track with the layout, the depth that the instructions were written at.'
Shop steward

' I don't think we had the discipline to do it. Peter (the Operations Manager) knew that; we needed guidance, help otherwise we'd have let it go. Without you pushing the barrow it wouldn't have got done, without you coming every Friday.'
Middle manager

Although this need for program facilitators was recognised, the WSU consultants did experience difficult moments due to their lack of engineering expertise. At times it was felt that trade or engineering knowledge would have been an aid in resolving disputes and completing the work instructions. However, the operations manager did not view this lack of technical expertise as a problem:

'For this training, which was directed at cultural change through a focus on technical and organisation issues, it is important that training personnel are not technically literate nor mechanistic in their approach to problem solving'.

An additional advantage was also noted. Because the WSU consultants did not have engineering or trade knowledge the employees did not feel intimidated by the trainers. It was his perception that the consultants brought common sense and impartiality, whilst the employees provided the necessary trade expertise. The trainers were able to express the ideas raised by the workers in the sometimes chaotic debates, in a succinct and accurate way.

Involving the whole workforce

The involvement of the entire workforce in the program was considered to be an extremely effective way to achieve a number of ends, including cultural change, and the documenting of operating instructions for all of the factory. Feedback from the company generally concurred with this positive assessment.

Feedback included:

'A lot of people wouldn't understand the whole process if not personally involved. You can't force people to read them but because we know everyone was involved we know everyone knows what they're about and have no excuse for not knowing.'

'It was good because everyone knew about it. Everyone was made aware on resorting to manuals if he had a problem or question.'

'Great idea. Gave us a chance to participate instead of just getting supervisors. I would have objected. These are jobs we do. We need a say in it. If something is written we couldn't understand unless we had been involved. Some supervisors haven't touched a tool in ages. Guys on the floor are the best ones to keep up with changes in procedures they are using.'

'I think they were good because they were step by step instructions. We (managers) didn't write them. We expected them to do it...anybody could read them.'

'Getting everyone involved, using the team factor, we(management) weren't dictating to them. If you get everyone in you can say, "you helped make this decision, let's make it stick".'

'It was easy to get underway because the workers told management how it was. That was the key to its success. Management wasn't telling us.'

Other issues

The majority of participants did not identify any negative aspects to the program, however some did express concern about the loss in production time. It was also felt that the program was a waste of time for individuals who gave little input during the workshops. The lack of commitment by a few of the less diligent workers meant that they were generally less cooperative. It was apparent that they felt it was easier than operating their machines, but put little effort into writing the instructions.

Auditing the operating instructions

The operating instructions are considered to be an integral part of Jaques' quality management of production. It is for this reason that an auditing system has been implemented to monitor their use. Auditing is seen as an opportunity to identify whether employees are following the operating instructions or if the instructions need to be updated. However, early reports suggest that improvements that could be gained through the auditing process are not being pursued to their full potential.

The shop steward is responsible for organising the weekly audits. He believes that audits are a good tool for educating employees about operating instructions, but notes that sometimes individuals take the easy option and select to audit a straightforward operating instruction. Furthermore, often the employees chosen for auditing are those who do conform. A production supervisor expressed his concern that employees tend not to read them unless they are doing an audit.

These problems are however being addressed by recent steps to improve the auditing process. The factory manager is aiming for ten audits a week. A computer program will be used to choose the employee to be audited at random. The health and safety representative will then audit these employees on the procedure in which they are engaged at that time. Areas which have a high incidence of accidents will also be targeted for audits. Employees agree that it requires commitment to maintain the effectiveness of the instructions with constant reminding of safe work practices being necessary.

Project costs

The cost to Jaques of the project included that of employee time release and the WSU consultancy services. Seventy-seven employees attended one and a half hour workshops during paid worktime fourteen times. In addition, there were twenty-two sessions of one and a half hours for between ten and thirty employees.

The WSU's fee, which was based on an hourly rate for training delivery time, amounted to approximately six hours consultancy per week. In the latter part of the project, the company was billed for both delivery and coordination time as this became a more time-consuming part of the project. In total Jaques was billed for approximately fifty weeks consultancy.

Numerically controlled lathe with operating instruction

The manager who commissioned the project considered it a very inexpensive way to achieve the detailed results, although in his opinion this kind of solution was an option especially suited to small businesses. It is not the path large multinational companies would be likely to choose.

The alternative of a consultant employed to do the writing of operating instructions for the quality system for the entire factory, is likely to have been more expensive. Even someone with an engineering background would have needed to consult with Jaques' personnel, thus also involving time release. The sought change in employee attitude towards safety would however have been unlikely to have been gained through this process.

If the writing of the operating instructions had not involved the entire workforce, a comprehensive training program would have needed to be conducted to introduce all employees to the instructions. It is doubtful that such an approach would have engendered the commitment and ownership that the WSU program achieved. In this case it could be argued that the extent of time release used in this project was cost effective given the multiple aims of the project.

Management believed that the cost of time release was justified. A manager who participated in the writing workshops commented:

'We needed everyone otherwise we would get no effect. It was excellent. It was the only way to do it. If you try to dictate to these people, they'll do the opposite. If you get them to be in a team together it flows so much easier.'

The current production supervisor, who was a contractor when he participated in the workshops, commented on the issue of lost production time and saw it as a longer term investment. 'There are initial costs, but the whole aim is to save money in the end by people knowing about safety and getting it right the first time.'

Quality Certification and the use of the operating instructions

Jaques has seen many changes in 1996. In 1996 the Workplace Skills Unit ceased facilitating the workshops at Jaques. New people have been appointed in management positions and factory personnel have been redeployed to different roles.

Early in 1996 quality certification was going ahead as planned. Documentation was being prepared for the audit scheduled in July. A consultant was working with the company to help in its bid. However, when a takeover of Jaques by Evans Deakin Industries was expected, Clyde Industries management suspended spending on quality certification. The company was subsequently bought out by Evans Deakin Industries. At this stage, Evans Deakin have not stated their support for Jaques' goal of quality standards certification.

Five months after the conclusion of the project, operating instructions for particular areas have been posted on machines and compiled to form reference manuals on the shopfloor. New employees are expected to read the instructions and explanations as to correct operating procedures are based on these written instructions. However, there is an indication that some new employees are unaware of the existence of the operating instructions.

The operating instructions are referred to when an accident has occurred to confirm whether or not the employee followed the correct procedure. Likewise, it may be identified that an improvement needs to be made to the instructions.

Feedback suggests that as time passes the operating instructions are being used more correctly and referred to more often.

The format for the operating instructions is to be utilised by the Workplace Skills Unit and Jaques in the development of additional manual handling operating instructions. It is also planned that the existing operating instructions will be revised to comply with the 1995 plant regulations and further training will be conducted.

Conclusion

The partnership between the Workplace Skills Unit and Jaques involved the bringing together of training expertise and industry knowledge and experience. It was clear from the outset that the WSU team's role was to facilitate the documenting of this knowledge and expertise. The Jaques employees responded positively to this acknowledgment of their workplace skills and seized the opportunity to demonstrate these skills.

Jaques management are to be commended for implementing such an innovative training strategy. The strategy required the Workplace Skills Unit to respond quickly to changes on the shopfloor and to adopt a flexible approach to training activities. The Jaques operations manager, in appraising this approach reflected that, 'initiatives taken by the Workplace Skills Unit to improve the effectiveness of groups and trainers are a key factor in retaining momentum in such loosely structured training.'

The employees are also to be commended for their willingness to participate in the workshops. For some this involved taking risks given their limited communication skills and associated lack of confidence. The written operating instructions will serve as a positive reminder of their achievements.

Jaques have received refunds on workcover premiums as the accident rate is now lower than the average for the metals and engineering sector. It has been suggested that this is because the company has been investing in training to improve safety in the workplace. The involvement of the production workforce in the writing of operating instructions has been a major part of this investment.